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Understanding the Relationship between Suicidality, Current Depressed Mood, Personality and Cognitive Factors

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Abstract

Objectives: Links between suicidality and depressed mood are well-established. There is, however, little information about the emotional regulation processes that underlie the relationship between suicidality and current low mood, and how these processes differ between groups of never-suicidal, suicidal-ideators and suicide attempters. As suicidality and depression are heterogeneous constructs, this study aimed to conduct within and between group comparisons of known suicide risk factors that are associated with emotion regulation (neuroticism; trait aggression; brooding; impulsivity and overgeneral autobiographical memories).

Design: Correlational design using between and within group comparisons from self-report measures.

Methods: Inter- and intra-group differences were identified using Pearson's correlation co-efficients and tests of difference. An analysis of indirect effects was used to investigate whether the relationship between suicidality and current low mood was mediated by neuroticism, trait aggression, brooding, impulsivity and overgeneral autobiographical memories, and if this relationship varied according to group type.

Results: Brooding appeared to be a consistent feature of all three groups and was closely related to current low mood. Compared to the never-suicidal group, the relationship between suicide attempts and current low mood showed greater associations with brooding, trait aggression and overgeneral autobiographical memories. Compared to the never-suicidal group, the suicide ideation group showed stronger associations with neuroticism and impulsivity but these factors did not correlate with low mood.

Conclusion: These results suggest a need for larger studies to focus on heterogeneity within suicidal populations and consider how different combinations of risk factors may heighten or reduce suicide risk. (245)

Keywords: Suicide, Trait Aggression, Impulsivity, Neuroticism, Rumination, Depressed Mood, low mood

Practitioner Points

- It is well-known that the severity and intensity of suicide and depressed presentations vary because of underlying dispositional and contextual factors (Fried & Nesse, 2015) which, in turn, affect how events are interpreted and responded to. Despite this, there is little research about how these mechanisms operate in different types of suicide groups, and their influence on the relationship between suicidality and current low mood.
- Understanding inter-relationships that affect current low mood is of clinical significance because past suicidal history and deteriorations in already negative mood are linked to repeated suicide attempts and completion.
- Our findings show that ruminative brooding, defined as a tendency to repeatedly think about emotional aspects of an event, consistently correlate with current low mood across different types of suicidal groups (never-suicidal, suicidal ideators and attempters), and across analyses.
- Findings also show that suicidal ideation and attempt groups were associated with specific personality characteristics that increased the propensity of emotional responding and interpretation compared to the never-suicidal group. The relationship between suicide attempt and current low mood had a higher propensity to be influenced by trait aggression, brooding and overgenerality compared to the never-suicidal group. In contrast, although the suicidal ideation group correlated more strongly with neuroticism and impulsivity, these factors did not influence current low mood.

- In terms of clinical practise, these findings imply that specific styles of interpretation and thinking may maintain the relationship between suicidality and current low mood. Given the cross-sectional nature of the study, however, it is not possible to imply causality. Nevertheless, the findings obtained provide some support for transdiagnostic models of cognitive-behavioural processes that could be developed further.

Understanding the Relationship between Suicidality, Current Low Mood, Personality and Cognitive Factors

Individual variations in emotional regulation can increase, or decrease, the propensity of depression (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Likewise, predisposing, precipitating and perpetuating factors can increase, or decrease, symptom severity and intensity, creating heterogeneity within suicidal and depressed groups (Fried & Nesse, 2015). To understand what maintains the relationship between suicidality and current low mood, we need to investigate internal (e.g. inhibitory control, recall style, thinking style, emotional reactivity and sensitivity) and external processes (behaviour) involved in emotion regulation (Sheppes, Suri, & Gross, 2015). Few studies, however, examine how variations in risk factors influence the relationship between suicidality and current low mood. Understanding current low mood is of clinical significance because deteriorations in current low mood are shown to increase probability of reattempting or completing suicide following a previous incident (Antypa, Van der Does, & Penninx, 2010; Appleby, Dennehy, Thomas, Faragher, & Lewis, 1999; Hawton & Fagg, 1988; ISD-Scotland, 2012; Wolfsdorf, Freeman, D'Eramo, Oveholser, & Spirito, 2003).

Moreover, despite numerous suicide risk factors being identified, it is still difficult to predict a suicidal crisis (Fawcett et al., 1990a; Goldstein, Black, Nasrallah, & Winokur, 1991). This suggests that a deeper understanding is required regarding the interactions between risk factors and their influence on different types of suicide groups. There is evidence to suggest that exploring levels of suicidality reveals similarities and differences between suicide groups that would otherwise remain undetected (Fawcett et al., 1990b; Rajappa, Gallagher, & Miranda,

2012). This is also consistent with the Cognitive Model of Suicide (Wenzel and Beck, 2008) which proposes that underlying dispositional vulnerabilities affect individual levels of distress tolerance (Anestis, Bagge, Tull, & Joiner, 2011). Having more vulnerabilities is thought to lower the distress tolerance threshold which, in turn, increases the likelihood of mood-disturbance or suicide-related cognitions.

Emotional regulation, however, is difficult to assess because of its multi-faceted nature. There is, nevertheless, growing evidence to suggest that emotional regulation difficulties are associated with increased emotional reactivity and sensitivity (Jollant, Lawrence, Olie, Guillaume, & Courtet, 2011; Nock, Wedig, Holmberg, & Hooley, 2008), which are sub-components of Neuroticism. Neuroticism measures how individuals interpret and respond to stressful situations (Bolger & Schilling, 1991; Eysenck, 1967; Vaughan-Johnston, Quickert, & MacDonald, 2017), which differs from depressed mood (Bowen, Wang, Balbuena, Houmphan, & Baetz, 2013). Neuroticism is evident across cultures (Terracciano & McCrae, 2006) and the lifespan (Gale, Booth, Mõttus, Kuh, & Deary, 2013; Van Os & Jones, 1999), with high ratings corresponding to overly emotional responses to everyday stressors (Suls, Green, & Hillis, 1998), possibly because distressing events are appraised as intolerable (de Bruin, Rassin, & Muris, 2007) and difficult to manage (Larsen & Ketelaar, 1991).

Trait aggression also refers to a specific form of emotional responding; an increased propensity to perceive and respond to situations in an overly angry or hostile manner. As such, both personality characteristics have the potential to influence perception, emotional processing and expression (Carver, Johnson, & Joormann, 2008; Robinson, Schmeichel, & Inzlicht, 2007).

Links between suicidality, depressed mood, neuroticism and trait aggression are well-established within the literature (Doihara et al., 2008; Wenzel & Beck, 2008) and there is evidence to suggest that these personality constructs can amplify emotional responding when combined with other risk factors, such as brooding, impulsivity and overgenerality (Dutton & Karakanta, 2013; Gvion & Apter, 2011; Wenzel & Beck, 2008).

Combining neuroticism with ruminative thinking, a tendency to repeatedly think passively about historical events, is shown to increase negative self-schematic information (Ciesla, Felton, & Roberts, 2011) and cognitive reactivity when faced with challenges (Nolan, Roberts, & Gotlib, 1998). While interactions between neuroticism and impulsivity also enhance negative affect, this seems to be due to a reliance on short-term, rather than longer-term, solutions (Carver & Miller, 2006; Fetterman, Robinson, Ode, & Gordon, 2010).

Similarly, for some individuals, aggressive behaviour could be the precursory indicator, and the primary source of difficulty, that maintains depressive episodes (Praag, 1998, 2001). While the relationship between suicidality, depression and anger is well-known (Cautin, Overholser, & Goetz, 2001) there is limited evidence about the factors that maintain this relationship. Studies, for instance, indicate that sad and angry ruminations overlap (Peled & Moretti, 2010), with the latter maintaining an internal state of anger (Berkowitz, 1993; Rusting & Nolen-Hoeksema, 1998b). It is not clear, though, whether these overlaps are associated with trait aggression and how the emotional content produced by such ruminations affects suicide risk. There is also debate over the inter-relationship between trait aggression and impulsivity, with some researchers suggesting that it represents a unitary vulnerability for suicide (Mann &

Currier, 2009; Mann, Waternaux, Haas, & Malone, 1999; Seroczynski, Bergeman, & Coccaro, 1999) and others arguing that each trait represents a distinct dimension (Critchfield, Levy, & Clarkin, 2004).

Suicidality and depression are also associated with a tendency to recall overgeneralized autobiographical memories (Williams & Broadbent, 1986). Instead of recalling discrete personal memories (e.g. 'last Sunday, I had a fight with my partner'), this means that memories are recalled for non-descript time-periods (e.g. 'my partner and I always fight'). While this retrieval style could provide perceived functional benefits, by passively avoiding distressing emotions (Williams et al., 2007), a reliance on this retrieval style has drawbacks in terms of reducing social problem solving skills in suicidal groups and decreasing imaginability for future events (Williams, Ellis, Tyers, & Healy, 1996), which may increase suicide risk.

Given that that multiple factors are associated with suicidality and low mood, the first aim was to investigate between and within group comparisons of known risk factors (neuroticism, trait aggression, rumination, impulsivity and overgenerality) to determine whether the inter-relationships between risk factors differed according to group type. The second aim was to compare risk profiles of suicidal ideators and attempters to a never-suicidal group using neuroticism, trait aggression, rumination, impulsivity and overgenerality as potential mediators of the suicidality-current depressed mood relationship. Given the cross-sectional nature of this study, causality is not assumed. Instead, we have used the Cognitive Model of Suicide ((Wenzel & Beck, 2008)) to provide a theoretical rationale for the statistical predictions proposed.

Methods

Participants

Never-suicidal (NS) and suicide-ideation (SI) groups were recruited from local communities through posters placed on noticeboards (GP surgeries, Universities, bus stations), and university bulletins. Participants in the NS group were recruited as part of a larger study that investigated the impact of personality and mood on autobiographical memories. This was stated in the NS group advertisement. Due to ethical concerns about recruiting active suicide ideators, advertisements for the SI group only invited individuals with historical suicidal ideation to take part and advised that no questions would be asked about historical suicidal thoughts. Telephone and e-mail contact details were provided.

The inclusion criteria, specified in adverts, stated participants aged 55 and under, with a good understanding of English and without a diagnosed neuropsychological condition (e.g., epilepsy or brain-injury), intellectual disability or substance misuse history were eligible to take part. Suicide ideation was determined by endorsing either one or both items on the Beck's Depression Inventory '*I would kill myself if I had the chance'* and the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) *'Have you ever wished you were dead?*. These questions reflect best practise guidelines and are considered to be valid and reliable estimates of suicidal ideation (Centre for Suicide Research, 2014, LivingWorks Education, 2013, National Risk Management Programme, 2007). Based on responses given, ninety participants were assigned to the NS group having self-reported never experiencing suicidal ideation or attempting suicide (51 male and 39 females). Twenty-six participants were assigned to the SI group based

on reports of historical suicidal ideation but no reports of suicide attempt history (17 males and 13 females). Ages ranged from 18-55, with the mean age range for both groups being 18-25.

The Suicide Attempt (SA) group was recruited from an Accident and Emergency department (NHS Tayside) within 24 hours of admission following a probable suicide attempt[2]. Lead clinicians assessed individuals to identify participants meeting the inclusion criteria following the completion of routine assessments (toxicology and neurological assessments).

During the testing period (Spring-Summer of 2010 and 2011), one hundred and eight individuals, who were admitted into a local Accident and Emergency department met the inclusion criteria. From this group, eighty three agreed to participate providing a 76% response rate (36 males and 47 females: mean age range: 18-25).

Descriptive statistics, from which the SA sample was drawn, suggest that suicidal intent was highest in individuals aged 30-35 followed by 24-29 year olds. Individuals in the 54-59 age banding, followed by 30-35 year olds, were most likely to engage in severe attempts, as assessed by the clinician. No other trends were observed.

Measures

The Eysenck Personality Questionnaire -EPQ-R (Eysenck & Eysenck, 1975): The neuroticism subscale is a psychometrically reliable and valid trait measure of emotional reactivity and sensitivity (Francis, Brown, & Philipchalk, 1992). Responses are yes/no answers with higher scores indicating higher levels of neuroticism (α = .78).

The Aggression Questionnaire -AQ (Buss & Perry, 1992): The AG contains 29 items (α =.89) which reliably assesses trait aggression across domains of physical, verbal, hostility and anger ((Harris, 1997)) using a 5-point scale. Higher scores correspond to higher levels of trait aggression. Though some aggression questionnaires show overlaps between related constructs (Miller & Lynam, 2006), this measure is considered to be free of such biases (Critchfield et al., 2004; Hennig, Reuter, Netter, Burk, & Landt, 2005).

The Ruminative Response Scale (Nolen-Hoeksema & Morrow, 1991): The RRS assesses a pervasive tendency to repeatedly think about past events in either a brooding or reflective style. Brooding (α = .75) refers to a tendency to focus on emotional aspects of an event whereas reflective rumination (α = .87) refers to a focus on situational components. Despite overlaps between related constructs, rumination is a distinctive thinking style (Nolen-Hoeksema & Watkins, 2011). The depression subscale from the RRS was excluded because of overlaps with low mood. Brooding and reflective rumination (5 items each), were analysed separately.

The Profile of Mood States: The PoMs (α = .85) uses 65 adjectives to assess mood severity (tension, depression, anger, vigor, fatigue and confusion) based on how participants feel

"right now" using a five-point scale rating. Given the focus of the study, only the 17-item depression sub-scale was used. The PoMs has been frequently used in suicide groups (Keilp et al., 2010; Nakao, Yamanaka, & Kuboki, 2002; Salkovskis, Atha, & Storer, 1990).

Barratt's Impulsivity Scale (Barratt, 1994)*:* The BIS contains 30 items ($\alpha = .86$) which assess behavioural, motor and non-planning impulsivity with ratings based on a 4-point-scale. As with other measures, this questionnaire was selected to assess related but discrete constructs (García-Forero, Gallardo-Pujol, Maydeu-Olivares, & Andrés-Pueyo, 2009; Gvion & Apter, 2011).

Autobiographical memory test (AMT: (Williams & Broadbent, 1986):

Cue word selection: Williams et al. (2007) suggest that using identical cue-words in different studies may undermine the generality of findings. We, therefore, used twelve different cue-words, representing categories of happy, sad, angry and neutral emotions, from a list created by Paivio, Yuille, and Madigan (1968). Each category of emotion was represented by three cue-words[3].

Instructions: Participants were asked to recall a specific memory, which happened in the last one to five years, in response to each cue-word. This was to ensure that recalled memories were embedded into the autobiographical memory hierarchy (Singer & Bonalume, 2010) and prevented the age of the memory acting as a confounding factor (Piolino et al., 2010). Instructions stated that the memory did not need to be salient and that while responses would be timed, the timing was not important. Participants were asked to differentiate between not wishing

to disclose and an inability to recall. Only six participants chose the former because the memory felt too personal.

A specific memory was defined as an event which lasted no longer than 24 hours whereas an overgeneral memory referred to a memory for a non-descript time period which lasted longer than 24 hours. An example using a neutral cue word ('house'), was given before commencing the test to ensure instructions were understood. Cue-words were read aloud in the same order (happy, grief, destroy, doctor, furious, love, sadness, world, unhappy, rage, bouquet, happiness), with a single prompt provided if an overgeneralized memory was recalled.

Recall and coding: Fourteen percent of transcripts were rated by three researchers, two of whom were blind to the study aims, using pre-defined definitions of specific and overgeneral memories. Inter-rater reliability was good for specific ($\alpha = .84$) and overgeneral memories ($\alpha = .77$). An omission was recorded if a semantic association was described (e.g. 'My sister went to the hospital') or if no narrative was provided. Percentages of overgeneralized memories recalled were used to standardize responses (Anderson, Goddard, & Powell, 2010).

Procedure

Following ethical approvals (IRAS and LECs), the researcher met with potential NS or SI participants in the same University room to provide further details and verbally assess the inclusion criteria. Hard copies of the information sheet and consent form were provided, which participants signed to indicate consent. Participants then provided demographic information (gender and age group). The medical research ethics committee included a stipulation regarding

recording of age to ensure that completed measures could not be traced back to participants using a combination of age, date of birth, date of admission or testing.

Following this, participants were given a packet of questionnaires that were completed in one sitting. The AMT was administered next, which was audio recorded with consent. After the debriefing, there was another opportunity to ask questions. The debriefing for the SI group involved checking for signs of current suicide risk by an appropriately trained researcher (primary author). None were reported. Nevertheless, all participants were made aware of local and national supports (G.P, helplines and counselling services).

Referrals for the SA group were verbally passed to the researcher by the clinician following ward-rounds (typically mid-morning) if interest was expressed. The researcher contacted interested participants to provide verbal and written details about the study, giving an opportunity to ask questions, before they signed the consent form. Potential participants in the SA group were also advised that taking part in this study would not affect their medical/ psychiatric care, subject to duty of care principles**.** As with other groups, participants were given a packet of questionnaires, which they completed in one sitting, with the AMT being administered next. Verbal and written debriefings were provided on completion of the study.

Results

A series of ANOVAs were performed to determine interactions between group type and gender. No statistically significant effects were observed for brooding, F (2, 85) = .22, p = .80, neuroticism F (2, 85) = 1.08, p = .34, trait aggression F (2, 85) = .174, p = .84, overgenerality F

(2, 85) = .07, p = .93, impulsivity F (2, 85) = .80, p = .45 or current low mood F (2, 85) = .48, p = .62.

Intra and intergroup differences.

Between groups differences were identified using tests of difference. Inter-relationships within group were analysed using Pearson's correlations. Though other correlations are reported, the primary focus was on the inter-relationships with current low mood.

As expected, the SI group rated higher on most measures compared to the NS group, with the exception of behavioural impulsivity, current angry mood and overgeneralized recall ratings, which remained similar across both groups (Table 1). Similarly, compared to the SI group, the SA group rated higher on most factors, with the exception of neuroticism and reflection. Results are reported at the two-tailed level following the application of a Bonferoni correction (.017).

PLEASE INSERT TABLE 1 HERE

Never-suicidal (NS) group.

In the NS group, positive inter-correlations were observed between current low mood and neuroticism (r = .36, p = .00) as well as current low mood and brooding (r = .35, p = .00). While brooding correlated with neuroticism (r = .34, p = .00) and impulsivity (r = .22, p = .04), reflective rumination only correlated with impulsivity (r = .27, p = .01). No significant associations were observed between reflective rumination and current low mood. Similarly, there

were no significant associations between trait aggression, overgeneralized memories and the rest of the variables under investigation.

Suicidal ideation group.

The main correlations of interest, in the SI group, related to the relationship between low mood and ruminative brooding (r = .56, p = .00). Ruminative brooding, in turn, correlated with neuroticism (r = .54, p = .00).

Recent suicide attempt group.

In the SA group, a number of statistically significant inter-correlations were observed between current low mood and brooding, impulsivity, neuroticism and trait aggression, respectively (Table 2).

PLEASE INSERT TABLE 2 HERE

Indirect effects.

The mediation analysis involved concurrently testing multiple mediating pathways with group type as the multi-categorical X variable and current low mood as the Y variable using the MEDIATE macro for IBM SPSS v.21 (Hayes & Preacher, 2012). The NS group was selected as the comparative reference group. Bias corrected percentile based bootstraps, based on 1000 repetitions, are reported to provide more conservative and accurate estimates of the indirect effects observed. The R^2 statistics provide a stable and reliable measure of effect size (Fairchild, MacKinnon, Taborga, & Taylor, 2009).

PLEASE INSERT TABLE 3 HERE

A significant association between suicidality and current low mood was observed, with the inclusion of group type improving the overall fitness of the model (Table 3). Findings indicate that, compared to the NS group, the SA group appeared to more strongly associated with current low mood (8 =1.03, p = .00*)*. The relationship between SI and current low mood did not statistically differ from the relationship between NS and current low mood. When group type and mediators were included into the analysis, only path c' for the SA group remained statistically significant (8 = .50, p = .015), even after applying a Bonferroni correction at the .017 level.

Individual group effects.

Compared to the NS reference group, the relationship between SA and current low mood appeared to be indirectly influenced by ruminative brooding, trait aggression and overgenerality (Figure 1).

PLEASE INSERT FIGURE 1 HERE

Interrelationships between impulsivity, neuroticism and current low mood did not significantly differ from those observed in the NS group in either SI or SA groups (Figure 2). In terms of individual paths, while impulsivity positively correlated with the SA group, the association between impulsivity and the SI group appeared to be stronger (Figures 1 & 2). Compared to the NS group, the SI group also showed a stronger relationship with neuroticism but neuroticism and impulsivity did not mediate the SI-current low mood relationship.

PLEASE INSERT FIGURE 2 HERE

Reliability and validity.

Current low mood was replaced with current angry mood to assess whether findings were generalizable to negative mood. Findings indicate that path *c'* remained significant after including mediators but did not reach significance levels when group type was added to the analysis, F (2,129) =.65, p = .52, R^2 =.006. The data was also re-analysed, excluding the SI group, to assess whether group size affected findings. Results show that while individual paths for the SA group appeared to be strengthened, the overall model fit, determined by the omnibus of total effects, reduced, F (2,166) = 172.6, p = .00, R^2 = .46.

Given the small sample size, a post-hoc power analysis was conducted. Options to calculate power for complex indirect models are limited because calculations need to account for variations in sample size, strength of indirect effects and individual path affects (Ze-wei & Wei-nan, 2014). Power was, therefore, determined by estimates for simple mediation models or dichotomous X models using beta values (Fritz & MacKinnon, 2007).

From these estimates, brooding was thought to reach a power level of .8 whereas the indirect effects of trait aggression and overgenerality were estimated to be slightly under-powered, reaching the .61 level (Ze-wei & Wei-nan, 2014). These differences in power could also be due to the fact that brooding was observed to have a larger effect on the relationship between SA and current low mood compared to trait aggression and overgenerality. Power was

not calculated for the SI group because no statistically significant indirect relationships were observed. A number of other precautions have also been taken to minimize type I and II errors. These include reporting indirect effects from bias corrected percentile bootstraps, use of Bonferroni corrections and cross validating findings with other sufficiently powered tests (e.g. Pearson's correlations, tests of difference).

Discussion

This study investigated inter-relationships between known suicide risk factors (neuroticism, trait aggression, brooding, impulsivity, overgenerality) and current low mood in different suicide groups. Despite limitations, this study provides important contributions to the existing literature. Overall, the data suggests that suicide groups are heterogeneous and that interactions between risk factors could represent different internal processing styles that vary between groups and may, hypothetically, influence emotion regulation. Findings are discussed in turn and related to broader theoretical arguments using literature on suicidality and emotional regulation.

Between group differences

While inter-relationships between neuroticism, rumination, impulsivity and low mood are well-documented, inter-relationships between trait aggression, rumination, impulsivity and low mood are not. Studies show that the interaction between neuroticism and rumination amplifies emotional responses (Muris, Roelofs, Rassin, Franken, & Mayer, 2005) and reduces recall of contended autobiographical memories (Teasdale & Green, 2004) which, in turn, may reduce mood.

Depression, however, is also linked to aggression, rumination and impulsivity (Dutton & Karakanta, 2013; Kendell, 1970; Maiuro, O'Sullivan, Michael, & Vitaliano, 1989; Van Praag, 2001). Rumination is thought to increase the likelihood of hostile event interpretation and when combined with a lack of self-control, increase the propensity for reactive aggression (Wilkowski, Robinson, & Troop-Gordon, 2010). Similar links are reported by others (Bushman, Bonacci,

Pederson, Vasquez, & Miller, 2005; Rusting & Nolen-Hoeksema, 1998a) but not by all (Lievaart, Huijding, van der Veen, Hovens, & Franken, 2017). Our findings add to this by suggesting that the SI group had a higher propensity of interpreting, ruminating and responding to events in an overly emotional manner, and rating their mood as lower, than the NS group. Likewise, differences between SA and SI groups imply that the former were more likely to interpret situations in an angry or hostile manner, recall overgeneralised memories, ruminate and respond impulsively compared to the SI group.

Within group differences

Next, we investigated whether these patterns remained the same within individual groups. In the NS group, inter-relationships between neuroticism, brooding and low mood remained consistent with existing literature. Correlations for the SI group, however, implied that neuroticism may indirectly affect the relationship between brooding and low mood. Between and indirect analyses appear to provide further support for this. The multiple inter-relationships observed in the SA group are consistent with those reported by emerging models of suicide. These models suggest that suicidality is associated with multiple vulnerabilities that affect event interpretation, thinking styles and emotional responses, and that the crossover from ideation to attempt depends on distress tolerance and the presence of specific factors (e.g. impulsivity, decreased imaginabilty for future events and prior suicidal behaviour) that decrease fear of dying and activate suicide-related-cognitions (O'Connor, 2011; Wenzel & Beck, 2008). While causality is not assumed, the data provides some support for these concepts.

Indirect Analysis

The final analysis explored these inter-relationships in more depth. Findings suggest that the relationship between the SA group and current low mood had a higher probability of being indirectly influenced by trait aggression, brooding and overgeneralised recall compared to the NS group. These findings are broadly consistent with the between group analysis, with the exception of impulsivity. Impulsivity did not influence the relationship between suicidality and current low mood and contrary to expectations, showed a stronger relationship with the SI group compared to the SA group. Indirect paths in the SI group did not differ from the NS group.

While internally and externally directed aggression are shown to correlate with depressed mood (Bridewell & Chang, 1997), Hirsch, Webb, and Jeglic (2012) suggest that suicidality only correlates with inwardly-directed anger and that forgiveness moderates the relationship between inward and outwardly directed aggression and suicidal behaviours. This is of particular interest given that internally directed aggression is often associated with shame (Gilbert & Andrews, 1998; Lutwak, Panish, Ferrari, & Razzino, 2001) and suicide notes often reflect themes of hostility, interpersonal difficulties and self-blame (Ho, Yip, Chiu, & Halliday, 1998; O'Connor, Sheehy, & O'Connor, 1999).

Rumination is shown to strengthen the relationship between anger and low mood by amplifying and maintaining an internal angry state (Rusting & Nolen-Hoeksema, 1998a). There is also evidence to suggest that an abstract processing mode, via a combination of overgeneralised recall and rumination, impairs social problem solving and disrupts emotional processing which, in turn, creates a higher propensity for depressogenic thinking (Watkins, 2008; Watkins & Teasdale, 2004). Wimalaweera and Moulds (2008) suggest that this abstract

processing mode also influences anger and angry memories. Their study shows that focusing on why questions, from field and observer prospectives, led to higher levels of intrusions in the following 24-hour period. Collectively, these studies imply that the relationship between recent suicide attempts and current low mood may be associated with inwardly directed aggression that could be amplified by an abstract processing style. Given that we did not assess inwardly or outwardly-directed aggression, and the limitations of a correlational study, future studies could explore how aggression affects cognitive processing, emotional regulation and suicidality further.

Interestingly, across all analyses and groups, brooding and low mood appeared to consistently correlate with each other. From a self-regulatory perspective, rumination provides a specific function: to allow reflection on the dissonance between a desired goal and current mood state (Carver & Scheier, 2002; Martin & Tesser, 1989). Once the dissonance is resolved, by achieving or re-evaluating the goal, theoretically, the rumination should end. Under conditions of low mood, however, rumination may increase the propensity for self-critical appraisals and pessimistic problem solving approaches (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Nolen-Hoeksema and Watkins (2011) suggest that rumination functions as a transdiagnostic risk factor that interacts with contextual and/or dispositional factors to produce an initial state of negative mood, which under conditions of stress or loss, is perpetuated by a cycle of negative thinking. Likewise, Harvey et al. (2004) suggest that similar cognitive behavioural processes could operate across disorders but still produce disorder-specific presentations due to interactions between underlying processes and current contexts. These trans-diagnostic perspectives are also seen in recent models of suicide (O'Connor, 2011; Wenzel & Beck, 2008).

From these perspectives, it may be that NS and SI group differ on specific dispositional vulnerabilities, which increase the likelihood of emotionally responding to problems by focusing on short-term solutions, as observed in between-group findings. Given that we chose to recruit from a population that reported historical ideation, it may be that these specific appraisal processes were not active or sufficiently distinct from the NS group or, it may be that the sample was too small to observe meaningful differences. Similarly, it may be that specific dimensions of impulsivity, not assessed here, correlate more strongly with SI and SA or it may be that the sample size was too small to detect an effect. Future studies may wish to investigate these inter-relationships further.

Limitations

Though the cross-sectional data limits what can be confidently interpreted, conservative estimates and other statistical tests were used to improve reliability and validity. A larger sample (approx. 396–512) is also required in order to conduct a sufficiently powered indirect analysis of aggression and overgenerality relationships investigated here (Fritz & MacKinnon, 2007; Thoemmes, MacKinnon, & Reiser, 2010). Caution is, therefore, advised when interpreting the indirect effect of trait aggression and overgenerality as they could, potentially, be underpowered. The recruitment strategy employed could also limit interpretation. The use of different testing sites (i.e. campus vs. ward), for instance, may have unintentionally biased responses; community advertisements with different aims may have led to the recruitment of individuals that were interested in the study for different purposes, and the lack of a structured clinical interview.

Whilst accepting these limitations, the sampling strategies had two aims. First, to provide an ecologically valid representation of individuals that clinicians would routinely encountered. As such, conceptually, prior to admission all three group members were community members, irrespective of whether they had been known to psychiatric services. Ethically, asking participants to attend the same testing site would have been impractical and may introduce other biases.

The second aim was to recruit individuals who had, or had not, experienced mood-disturbance and suicide-related cognitions. While other variables, not assessed here, could also influence the investigated relationships (e.g. diagnoses, treatment or history), it would be improbable to investigate all known factors. Instead, factor selection and analyses were guided by a theoretical model (The Cognitive Model of Suicide). Detailed information, generated by a structured clinical interview, was considered to be surplus to study requirements. Instead, questions were limited to those relevant to the study (Nordgaard, Revsbech, Saebye, & Parnas, 2012), with the procedure adopted being similar to others (Miranda & Nolen-Hoeksema, 2007) and reflecting best practise guidelines. Clinical interviews would also require additional ethical clearance to manage disclosures or diagnoses. Concerns around advertising for the community groups were balanced with considerations on how best to maximize recruit for both community groups.

Implications and Conclusions

The current study adds to the current literature by suggesting that SI and SA groups are associated with specific dispositional vulnerabilities that are associated with interpreting and responding to events in an emotional manner. Secondly, that these dispositional vulnerabilities appear to interact with a ruminative thinking style. In the SA group, it appears that the relationship between trait aggression, brooding and overgeneralised recall is positively associated with current low mood. In the SI group, no such association was observed with low mood. While these results are limited, they do provide support for transdiagnostic models of rumination and suicide. Future studies may wish to explore these assumptions further or investigate the heterogeneity within suicide attempters or ideators in more depth. In terms of clinical practise, it may be interesting to investigate whether targeting specific emotional regulation strategies (i.e. event interpretation or repetitive thinking patterns) via compassion or cognitive-focused therapies influences low mood symptoms in individuals who have recently attempted suicide. Findings obtained also indicate a necessity for therapeutic interventions immediately following a suicide attempt.

Total word count 4, 990

Footnotes

1. While these statistics are likely to be underestimation, as not all attempts result in hospital admissions, there is some indication that individuals who attempt and those who complete suicide should not be regarded as necessarily a different population (Beautrais, 2001).

2. Though suicide intent is associated with the use of more extreme methods of attempting suicide, it is not always considered to be the most reliable indicator of an actual attempt (Haw, Casey, Holmes, & Hawton, 2015; Kovacs & Garrison, 1985) as it could be moderated by personal expectations (Brown, Henriques, Sosdjan, & Beck, 2004). The variability of suicide intent also has an impact on how suicide rates are measured (Levinger, Holden, & Ben-Dor, 2015). The term 'probable suicide', therefore, is used as a guesstimate of an individual's intention based on a suicide risk continuum as assessed by a structured clinical risk assessment carried out by the clinician involved in the individual's medical care (Katz, Bolton, & Sareen, 2015).

3. In a pilot study, participants (n = 21; subsequently excluded from participation in this or other related studies) were given 86 emotional words and asked to rate them based on how well each word described happy, sad and angry emotions using a five-point scale. Higher scores indicated stronger agreement. Participants were also asked to identify which words they considered to be emotionally neutral. As the words were originally taken from Paivio et al. (1968), they had been previously matched for concreteness, imaginability and vividness.

* refers to significance at the .05 level

** refers to significance at the .01 level (with a Bonferroni correction applied)

Table 1

Descriptive Statistics for Personality, Mood and Memory Variables for NS, SI and SA groups

	NS Group Mean (SD) n = 89	Direction of significant differences	SI Group Mean (SD) n = 26	Direction of significant differences	SA Group Mean (SD) n = 83
Neuroticism	6 (3.4)	< $U = 676$, $p = .00$	8.6 (2.8)	Ns	9 (2.8)
Trait Aggression	62 (12.6)	< $U = 440$, $p = .01$	72 (16.3)	> $U = 596.5$, $p = .01$	88 (27)
Brooding	9 (3.1)	< $U = 740$, $p = .01$	12 (4.1)	> $U = 471$, $p = .00$	16 (4.0)
Reflection	9 (3.6)	< $U = 593.5$, $p = .00$	12 (3.9)	Ns	13 (3.9)
Overgeneral Memories (%)	31 (29.1)	Ns	23 (23.8)	> $U = 489$, $p = .00$	44 (23)
Current Low Mood	4 (5.7)	< $U = 783$, $p = .01$	11 (13.7)	> $U = 307$, $p = .00$	34 (17.6)
Behavioural Impulsivity	43 (29.7)	Ns	68 (15.8)	> $U = 303.5$, $p = .01$	78 (14.8)
Current Angry Mood	3 (4.5)	Ns	5.5 (6.5)	> $U = 513$, $p = .00$	15 (13)

Table 2

Pearson's Correlation for the recent suicide attempt group (n = 78), 2 tailed

	Brooding	Reflection	Neuroticism	Overgeneralized Memories	Current Low Mood	Current Angry Mood	Trait Aggression	Behavioural Impulsivity
Brooding		.51**	.52**	-.04	.51**	.34**	.36**	.28*
Reflection	.51**		.55**	-.09	.24*	.15	.30**	.18
Neuroticism	.52**	.55**		.04	.46**	.33**	.33**	.19
Overgeneralized Memories	-.04	-.09	.04		.18	.07	-.06	.04
Current Low Mood	.51**	.24*	.46**	.18		.52**	.42**	.50**
Current Angry Mood	.34**	.15	.33**	.07	.52**		.45**	.32**
Trait Aggression	.36**	.30**	.33**	-.06	.42**	.45**		.61**
Behavioural Impulsivity	.28*	.18	.19	.04	.50**	.32**	.61**	

Table 3

Summary of Indirect Path Analysis

Steps	Path C’			
	F	*df*	*P*	*Adjusted R_2*
Step 1: X → Y				
Omnibus of total effects	47.37	3, 134	.00	.51
Step 2: X → Y				
Test of Total Effects- Groups only	49.13	2, 134	.00	.36
Step 3: X→M_1→M_2→M_X→ Y		8, 129		.66
Test of Total Effects- Mediators only	31.62		.01	
Brooding	45.06	3, 134	.00	.50
Trait Aggression	21.16	3, 134	.01	.32
Overgenerality	3.56	3, 134	.02	.07
Impulsivity	66.47	3, 134	.00	.60
Neuroticism	66.47	3, 134	.00	.60

Figure 1

Direct and Indirect Relationships between Recent Suicide Attempts and Current Low Mood Compared to Never Suicidal Individuals

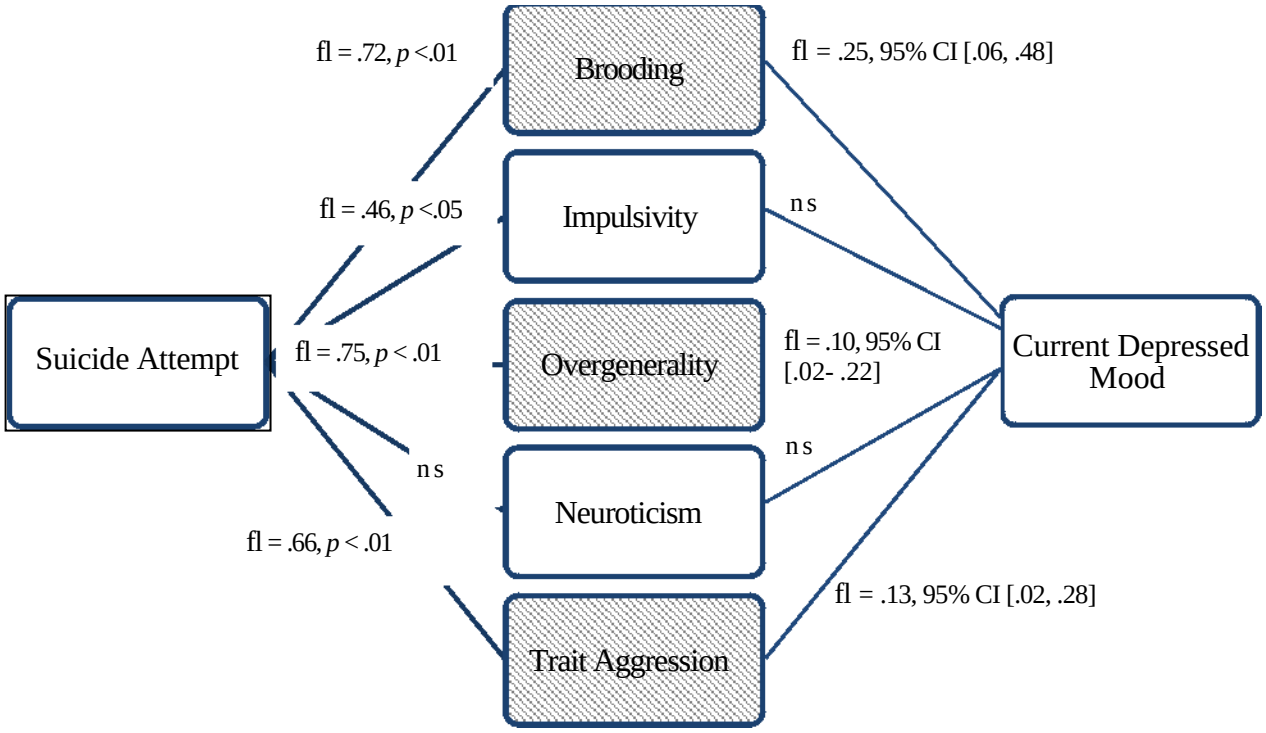
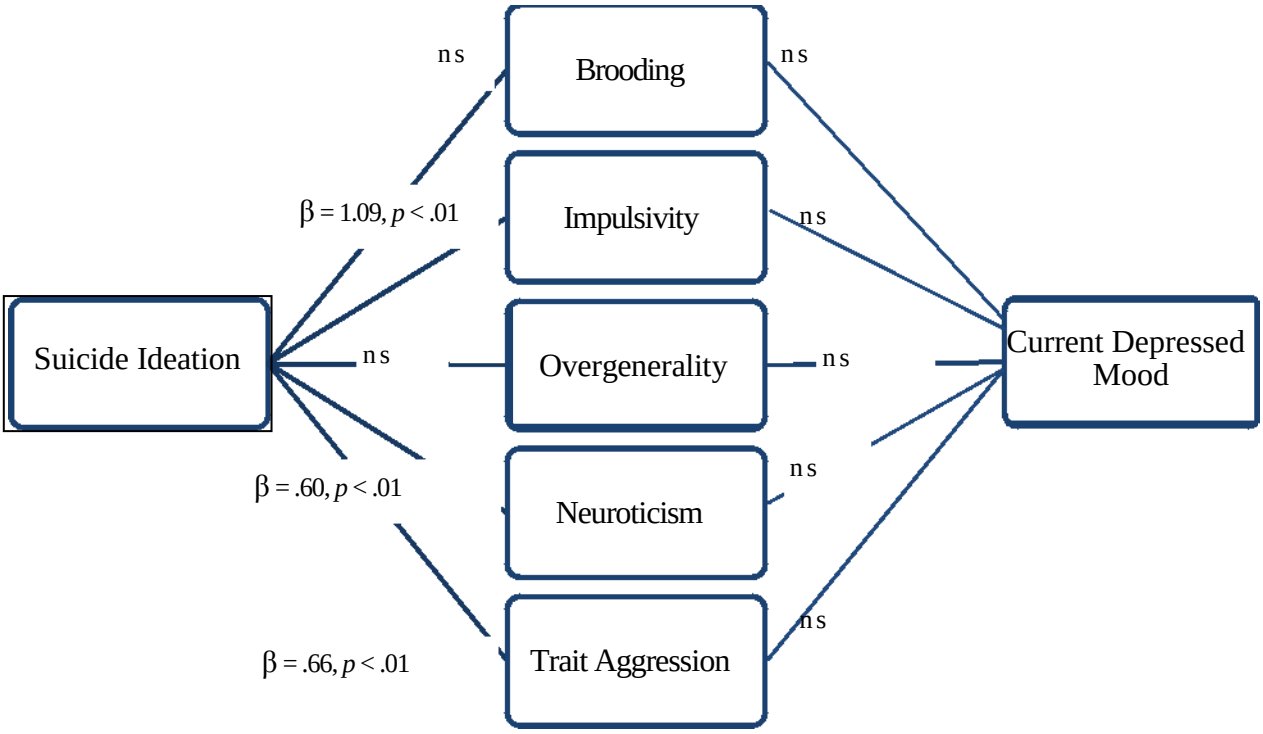


Figure 2

Direct and Indirect Relationships between Suicidal Ideation and Current Low Mood Compared to Never Suicidal Individuals



References

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*(2), 217-237. doi:http://dx.doi.org/10.1016/j.cpr.2009.11.004

Anderson, R., Goddard, L., & Powell, J. H. (2010). Reduced specificity of autobiographical memory as a moderator of the relationship between daily hassles and depression. *Cognition and Emotion, 24*(4), 702-709. doi:doi:10.1080/02699930802598029

Anestis, M. D., Bagge, C. L., Tull, M. T., & Joiner, T. E. (2011). Clarifying the role of emotion dysregulation in the interpersonal-psychological theory of suicidal behavior in an undergraduate sample. *Journal of Psychiatric Research, 45*(5), 603-611.

Antypa, N., Van der Does, A. J. W., & Penninx, B. W. J. H. (2010). Cognitive reactivity: Investigation of a potentially treatable marker of suicide risk in depression. *Journal of Affective Disorders, 122*(1), 46-52.

Appleby, L., Dennehy, A., Thomas, C., Faragher, E., & Lewis, G. (1999). Aftercare and clinical characteristics of people with mental illness who commit suicide: a case-control study. *Lancet, 353*, 1397-1400. doi:DOI:10.1016/S0140-6736(98)10014-4

Barratt, E. S. (1994). Impulsivity and aggression In J. Monahan & H. J. Steadman (Eds.), *Violence and Mental Disorder: Developments in Risk Assessment*. Chicago: University of Chicago Press.

Beautrais, A. L. (2001). Suicides and serious suicide attempts: two populations or one? *Psychological Medicine, 31*, 837-845.

Berkowitz, L. (1993). *Aggression: Its causes, consequences and control*. New York: McGraw Hill.

Bolger, N., & Schilling, E. A. (1991). Personality and the Problems of Everyday Life: The Role of Neuroticism In Exposure and Reactivity to Daily Stressors. *Journal of Personality, 59*(3), 355-386. doi:10.1111/j.1467-6494.1991.tb00253.x

Bowen, R. C., Wang, Y., Balbuena, L., Houmphan, A., & Baetz, M. (2013). The relationship between mood instability and depression: Implications for studying and treating depression. *Medical Hypotheses, 81*(3), 459-462. doi:http://dx.doi.org/10.1016/j.mehy.2013.06.010

Bridewell, W. B., & Chang, E. C. (1997). Distinguishing between anxiety, depression, and hostility: Relations to anger-in, anger-out, and anger control. *Personality and Individual Differences, 22*(4), 587-590. doi:10.1016/S0191-8869(96)00224-3

Brown, G. K., Henriques, G. R., Sosdjan, D., & Beck, A. T. (2004). Suicide intent and accurate expectations of lethality: Predictors of medical lethality of suicide attempts. *Journal of Consulting and Clinical Psychology, 72*(6), 1170-1174. doi:10.1037/0022-006X.72.6.1170

Bushman, B., Bonacci, A. M., Pederson, W. C., Vasquez, E. A., & Miller, N. (2005). Chewing on it can eat you up; Effects of Rumination on triggered displaced Aggression. *Journal of Personality and Social Psychology, 88*(Journal Article), 969-983.

Buss, H. A., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63*(Journal Article), 452-459.

Carver, C. S., Johnson, S. L., & Joormann, J. (2008). Serotonergic Function, Two-Mode Models of Self-Regulation, and Vulnerability to Depression: What Depression Has in Common With Impulsive Aggression. *Psychological Bulletin, 134*(6), 912-943.

Carver, C. S., & Miller, C. J. (2006). Relations of serotonin function to personality: Current views and a key methodological issue. *Psychiatry Research, 144*(1), 1-15. doi:http://dx.doi.org/10.1016/j.psychres.2006.03.013

Carver, C. S., & Scheier, M. F. (2002). Control Processes and self organization as complementary principles underlying behavior. *Personality and Social Psychology Review, 6*, 304.

Cautin, R. L., Overholser, J. C., & Goetz, P. (2001). Assessment of mode of anger expression in adolescent psychiatric inpatients. *Adolescence, 36*(141), 163-170.

Centre for Suicide Research, U. o. O. (2014). Assessment of suicide risk in people with depression.

Ciesla, J. A., Felton, J. W., & Roberts, J. E. (2011). Testing the cognitive catalyst model of depression: Does rumination amplify the impact of cognitive diatheses in response to stress? *Cognition & Emotion, 25*(8), 1349-1357. doi:10.1080/02699931.2010.543330

Critchfield, K. L., Levy, K. N., & Clarkin, J. F. (2004). The relationship between impulsivity, aggression, and impulsive-aggression in borderline personality: an empirical analysis of self-report measures. *Journal of Personality Disorders, 18*(6), 555-570.

de Bruin, G. O., Rassin, E., & Muris, P. (2007). The prediction of worry in non-clinical individuals: The role of intolerance of uncertainty, meta-worry and neuroticism. *Journal of Psychoapthology and Behavioral Assessment, 29*, 93-100. doi:10.1007/s10862-006-9029-6

Doihara, C., Kawanishi, C., Yamada, T., Sato, R., Hasegawa, H., Furuno, T., . . . Hirayasu, Y. (2008). Trait aggression in suicide attempters: A pilot study. *Psychiatry and Clinical Neurosciences, 62*(3), 352-354.

Dutton, D. G., & Karakanta, C. (2013). Depression as a risk marker for aggression: A critical review. *Aggression and Violent Behavior, 18*(2), 310-319. doi:http://dx.doi.org/10.1016/j.avb.2012.12.002

Education, L. (2013). Evidence in support of the ASIST program *ASIST*: Livingworks USA.

Eysenck, H. (1967). *The Biological Basis of Personality*. Springfield, Illinois: Thomas.

Eysenck, H., & Eysenck, S. (1975). *Manual of the Eysenck Personality Questionnaire*. London: Hodder & Stoughton.

Fairchild, A. J., MacKinnon, D. P., Taborga, M. P., & Taylor, A. B. (2009). R(2) effect-size measures for mediation analysis. *Behavior Research Methods, 41*(2), 486-498. doi:10.3758/BRM.41.2.486

Fawcett, J., Scheftner, W. A., Fogg, L., Clark, D. C., Young, M. A., Hedeker, D., & Gibbons, R. (1990a). Time-related predictors of suicide in major affective disorder. *Am J Psychiatry, 147*(9), 1189-1194.

Fawcett, J., Scheftner, W. A., Fogg, L., Clark, D. C., Young, M. A., Hedeker, D., & Gibbons, R. (1990b). Time-related predictors of suicide in major affective disorder. *American Journal of Psychiatry, 147*(9), 1189-1194.

Fetterman, A. K., Robinson, M. D., Ode, S., & Gordon, K. H. (2010). Neuroticism as a risk factor for behavioral dysregulation: A mindfulness-mediation perspective. *Journal of Social and Clinical Psychology, 29*(3), 301-321.

Francis, L. J., Brown, L. B., & Philipchalk, R. (1992). The development of an abbreviated form of the Revised Eysenck Personality Questionnaire (EPQR-A): Its use among students in England, Canada, the USA and Australia. *Personality and Individual Differences, 13*, 443-449.

Fried, E. I., & Nesse, R. M. (2015). Depression is not a consistent syndrome: an investigation of unique symptom patterns in the STAR* D study. *Journal of Affective Disorders, 172*, 96-102.

Fritz, M. S., & MacKinnon, D. P. (2007). Required Sample Size to Detect the Mediated Effect. *Psychological science, 18*(3), 233-239. doi:10.1111/j.1467-9280.2007.01882.x

Gale, C. R., Booth, T., Mõttus, R., Kuh, D., & Deary, I. J. (2013). Neuroticism and Extraversion in youth predict mental wellbeing and life satisfaction 40 years later. *Journal of research in Personality, 47*(6), 687-697. doi:http://dx.doi.org/10.1016/j.jrp.2013.06.005

García-Forero, C., Gallardo-Pujol, D., Maydeu-Olivares, A., & Andrés-Pueyo, A. (2009). Disentangling impulsiveness, aggressiveness and impulsive aggression: An empirical approach using self-report measures. *Psychiatry Research, 168*, 40-49. doi:10.1016/j.psychres.2008.04.002

Gilbert, P., & Andrews, B. (1998). Shame. *Shame: Interpersonal Behavior, Psychopathology, and Culture: Interpersonal Behavior, Psychopathology, and Culture*, 1.

Goldstein, R. B., Black, D. W., Nasrallah, A., & Winokur, G. (1991). The prediction of suicide: Sensitivity, specificity, and predictive value of a multivariate model applied to suicide among 1906 patients with affective disorders. *Archives of General Psychiatry, 48*, 418-422.

Gvion, Y., & Apter, A. (2011). Aggression, Impulsivity, and Suicide Behavior: A Review of the Literature. *Archives of Suicide Research, 15*, 93–112. doi:10.1080/13811118.2011.565265

Harris, J. A. (1997). A further evaluation of The Aggression Questionnaire: Issues of validity and reliability. *Behaviour Research and Therapy, 35*(11), 1047-1053. doi:http://dx.doi.org/10.1016/S0005-7967(97)00064-8

Haw, C., Casey, D., Holmes, J., & Hawton, K. (2015). Suicidal Intent and Method of Self-Harm: A Large-scale Study of Self-Harm Patients Presenting to a General Hospital. *Suicide and Life-Threatening Behavior, 45*(6), 732-746. doi:10.1111/sltb.12168

Hawton, K., & Fagg, J. (1988). Suicide, and other causes of death, following attempted suicide. *The British Journal of Psychiatry, 152*(3), 359-366.

Hayes, A. F., & Preacher, K. J. (2012). Statistical mediation analysis with a multicategorical independent variable. *Manuscript submitted for publication*.

Hennig, J., Reuter, M., Netter, P., Burk, C., & Landt, O. (2005). Two types of aggression are differentially related to serotonergic activity and the A779C TPH polymorphism. *Behavioral Neuroscience, 119*(1), 16-24.

Hirsch, J. K., Webb, J. R., & Jeglic, E. L. (2012). Forgiveness as a moderator of the association between anger expression and suicidal behaviour. *Mental Health, Religion & Culture, 15*(3), 279-300. doi:10.1080/13674676.2011.571666

Ho, T. P., Yip, P. S., Chiu, C. W., & Halliday, P. (1998). Suicide notes: what do they tell us? *Acta Psychiatr Scand, 98*(6), 467-473.

ISD-Scotland. (2012). *Scottish Suicide Database 2012 report: 2009-2010 data*. National Services Scotland Retrieved from http://www.isdscotland.org/Health-Topics/Public-Health/Publications/2012-12-18/2012-12-18-ScotSID-2012-Report.pdf.

Jollant, F., Lawrence, N. L., Olie, E., Guillaume, S., & Courtet, P. (2011). The suicidal mind and brain: a review of neuropsychological and neuroimaging studies. *World J Biol Psychiatry, 12*(5), 319-339. doi:10.3109/15622975.2011.556200

Katz, C., Bolton, J., & Sareen, J. (2015). The prevalence rates of suicide are likely underestimated worldwide: why it matters. *Social Psychiatry and Psychiatric Epidemiology*, 1-3. doi:10.1007/s00127-015-1158-3

Keilp, J., Oquendo, M., Stanley, B., Burke, A., Cooper, T., Malone, K., & Mann, J. (2010). Future Suicide Attempt and Responses to Serotonergic Challenge. *Neuropsychopharmacology, 35*, 1063-1072. doi:DOI: 10.1038/npp.2008.28

Kendell, R. E. (1970). Relationship between aggression and depression: Epidemiological implications of a hypothesis. *Archives of General Psychiatry, 22*(4), 308-318.

Kovacs, M., & Garrison, B. (1985). Hopelessness and eventual suicide: a 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry, 1*(42), 559-563.

Larsen, R. J., & Ketelaar, T. (1991). Personality and susceptability to positive and negative mood states. *Journal of Personality and Social Psychology, 61*(1), 132-140.

Levinger, S., Holden, R. R., & Ben-Dor, D. H. (2015). Examining the Importance of Mental Pain and Physical Dissociation and the Fluid Nature of Suicidality in Young Suicide Attempters. *OMEGA-Journal of Death and Dying*, 0030222815575899.

Lievaart, M., Huijding, J., van der Veen, F. M., Hovens, J. E., & Franken, I. H. A. (2017). The impact of angry rumination on anger-primed cognitive control. *Journal of Behavior Therapy and Experimental Psychiatry, 54*, 135-142. doi:http://dx.doi.org/10.1016/j.jbtep.2016.07.016

Lutwak, N., Panish, J. B., Ferrari, J. R., & Razzino, B. E. (2001). Shame and guilt and their relationship to positive expectations and anger expressiveness. *Adolescence, 36*(144), 641.

Maiuro, R. D., O'Sullivan, M. J., Michael, M. C., & Vitaliano, P. P. (1989). Anger, hostility, and depression in assaultive vs. suicide-attempting males. *Journal of Clinical Psychology, 45*(4), 531-541.

Mann, J. J., & Currier, D. (2009). Biological predictors of suicidal behavior in mood disorders. In D. Wasserman & C. Wasserman (Eds.), *Oxford Textbook of Suicide Prevention. A Global Perspective*. Oxford: Oxford University Press.

Mann, J. J., Waternaux, C., Haas, G. L., & Malone, K. M. (1999). Toward a clinical model of suicidal behavior in psychiatric patients. *American Journal of Psychiatry, 156*(2), 181-189.

Martin, L. L., & Tesser, A. (1989). Toward a motivational and structural theory of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 306-326). New York: Guildford Press.

Miller, J. D., & Lynam, D. R. (2006). Reactive and proactive aggression: Similarities and differences. *Personality and Individual Differences, 41*(8), 1469-1480. doi:http://dx.doi.org/10.1016/j.paid.2006.06.004

Miranda, R., & Nolen-Hoeksema, S. (2007). Brooding and reflection: Rumination predicts suicidal ideation at 1-year follow-up in a community sample. *Behavior Research and Therapy, 45*, 3088-3095.

Muris, P., Roelofs, J., Rassin, E., Franken, I., & Mayer, B. (2005). Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Personality and Individual Differences, 39*(6), 1105-1111. doi:http://dx.doi.org/10.1016/j.paid.2005.04.005

Nakao, M., Yamanaka, G., & Kuboki, T. (2002). Suicidal ideation and somatic symptoms of patients with mind/body distress in a Japanese psychosomatic clinic. *Suicide and Life-Threatening Behavior, 32*, 80-90. doi:DOI: 10.1521/suli.32.1.80.22179

Nock, M. K., Wedig, M. M., Holmberg, E. B., & Hooley, J. M. (2008). The Emotion Reactivity Scale: Development, Evaluation, and Relation to Self-Injurious Thoughts and Behaviors. *Behavior Therapy, 39*(2), 107-116. doi:http://dx.doi.org/10.1016/j.beth.2007.05.005

Nolan, S. A., Roberts, J. E., & Gotlib, I. H. (1998). Neuroticism and rumination response style as predictors of change in depressive symptomatology. *Cognitive Therapy and Research, 22*(5), 445-455.

Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and post traumatic stress symptoms following a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology, 61*, 115-121. doi:doi:10.1037/0022-3514.61.1.115

Nolen-Hoeksema, S., & Watkins, E. R. (2011). A heuristic for developing transdiagnostic models of psychopathology explaining multifinality and divergent trajectories. *Perspectives on Psychological Science, 6*(6), 589-609. doi:10.1177/1745691611419672

Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking Rumination. *Perspectives on Psychological Science, 3*(5), 400-424.

Nordgaard, J., Revsbech, R., Saebye, D., & Parnas, J. (2012). Assessing the diagnostic validity of a structured psychiatric interview in a first-admission hospital sample. *World Psychiatry, 11*(3), 181-185.

O'Connor, R. C., Sheehy, N. P., & O'Connor, D. B. (1999). A thematic analysis of suicide notes. *Crisis: The Journal of Crisis Intervention and Suicide Prevention, 20*(3), 106-114.

O'Connor, R. C. (2011). The integrated motivational-volitional model of suicidal behavior. *Crisis, 32*(6), 295-298. doi:10.1027/0227-5910/a000120

Paivio, A., Yuille, J., & Madigan, S. (1968). Concreteness, imagery and meaningfulness values for 925 nouns. *Journal of Experimental Psychology, 76*(1: Part 2), 1-25. doi:doi:10.1037/h0025327

Peled, M., & Moretti, M. (2010). Ruminating on Rumination: are Rumination on Anger and Sadness Differentially Related to Aggression and Depressed Mood? *Journal of Psychopathology and Behavioral Assessment, 32*(1), 108-117. doi:10.1007/s10862-009-9136-2

Piolino, P., Coste, C., Martinelli, P., Macé, A. L., Quinette, P., Guillery-Girard, B., & Belleville, S. (2010). Reduced specificity of autobiographical memory and aging: do the executive and feature binding functions of working memory have a role? *Neuropsychologia, 48*(2), 429-440. doi:doi:10.1016/j.neuropsychologia.2009.09.035

Praag, H. M. V. (1998). Anxiety and Increased Aggression as Pacemakers of Depression. *Acta Psychiatrica Scandinavica Supplementum, 98*(Suppl: 393), 81-88.

Praag, H. M. V. (2001). Anxiety/ Aggression driven depression: A Paradigm of Functionalisation and Verticalization of Psychiatric Diagnosis. *Programme of Neuro-Psychopharmacological and Biological Psychology, 25*, 893-924.

Programme, N. R. M. (2007). *Best Practice in Managing Risk: Principles and Evidence for Best Practice in the Assessment and Management of Risk to Self and Others in Mental Health Services*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment data/file/478595/best-practice-managing-risk-cover-webtagged.pdf.

Rajappa, K., Gallagher, M., & Miranda, R. (2012). Emotion dysregulation and vulnerability to suicidal ideation and attempts. *Cognitive Therapy and Research, 36*(6), 833-839.

Robinson, M. D., Schmeichel, B. J., & Inzlicht, M. (2007). Personality, Affective Processing, and Self-Regulation: Toward Process-Based Views of Extraversion, Neuroticism, and Agreeableness. *Social and Personality Psychology Compass, 1*(1), 223-235.

Rusting, C., & Nolen-Hoeksema, S. (1998a). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*(Journal Article), 790-803.

Rusting, C., & Nolen-Hoeksema, S. (1998b). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*, 790-803.

Salkovskis, P. M., Atha, C., & Storer, D. (1990). Cognitive-behavioural problem solving in the treatment of patients who repeatedly attempt suicide. A controlled trial. *The British Journal of Psychiatry, 157*, 871-876. doi:DOI: 10.1192/bjp.157.6.871

Seroczynski, A. D., Bergeman, C. S., & Coccaro, E. F. (1999). Etiology of the impulsivity/aggression relationship: genes or environment? *Psychiatry Research, 86*, 41-57.

Sheppes, G., Suri, G., & Gross, J. J. (2015). Emotion regulation and psychopathology. *Annual Review of Clinical Psychology, 11*, 379-405. doi:10.1146/annurev-clinpsy-032814-112739

Singer, J. A., & Bonalume, L. (2010). Toward the Scientific Study of Autobiographical Memory Narratives in Psychotherapy. *Pragmatic Case Studies in Psychotherapy, 6*, 215-222.

Suls, J., Green, P., & Hillis, S. (1998). Emotional Reactivity to Everday Problems, Affective Inertia and Neuroticism. *Personality and Social Psychology Bulletin, 24*(2), 127-136. doi:doi: 10.1177/0146167298242002

Teasdale, J. D., & Green, H. A. C. (2004). Ruminative self-focus and autobiographical memory. *Personality and Individual Differences, 36*(8), 1933-1943. doi:http://dx.doi.org/10.1016/j.paid.2003.08.022

Terracciano, A., & McCrae, R. R. (2006). Cross-Cultural Studies of Personality Traits and their Relevance to Psychiatry. *Epidemiologia e psichiatria sociale, 15*(3), 176-184.

Thoemmes, F., MacKinnon, D. P., & Reiser, M. R. (2010). POWER ANALYSIS FOR COMPLEX MEDIATIONAL DESIGNS USING MONTE CARLO METHODS. *Structural equation modeling : a multidisciplinary journal, 17*(3), 510-534. doi:10.1080/10705511.2010.489379

Van Os, J. B., & Jones, P. (1999). Early risk factor and adult person-environment relationships in affective disorder. *Psychological Medicine, 29*(5), 1055-1067.

Van Praag, H. M. (2001). Anxiety/aggression-driven depression: A paradigm of functionalization and verticalization of psychiatric diagnosis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 25*(4), 893-924.

Vaughan-Johnston, T. I., Quickert, R. E., & MacDonald, T. K. (2017). Psychological flexibility under fire: Testing the incremental validity of experiential avoidance. *Personality and Individual Differences, 105*, 335-349. doi:http://dx.doi.org/10.1016/j.paid.2016.10.011

Watkins, E. (2008). Constructive and Unconstructive Repetitive Thoughts. *Psychological Bulletin, 134*(2), 163-206.

Watkins, E., & Teasdale, J. D. (2004). Adaptive and Maladaptive self-focus in depression. *Journal of Affective Disorders, 82*(Journal Article), 1-8.

Wenzel, A., & Beck, A. T. (2008). A cognitive model of suicidal behavior: Theory and treatment. *Applied and Preventive Psychology, 12*(4), 189-201.

Wilkowski, B. M., Robinson, M. D., & Troop-Gordon, W. (2010). How does cognitive control reduce anger and aggression? The role of conflict monitoring and forgiveness processes. *Journal of Personality and Social Psychology, 98*(5), 830-840. doi:10.1037/a0018962

Williams, J. M. G., Barnhofer, T., Crane, C., Hermans, D., Raes, F., Watkins, E., & Dalgleish, T. (2007). Autobiographical Memory Specificity and Emotional Disorder. *Psychological Bulletin, 133*, 122-148.

Williams, J. M. G., & Broadbent, K. (1986). Autobiographical Memory in Suicide Attempters. *Journal of Abnormal Psychology, 95*, 144-149. doi:doi:10.1037/0021-843X.95.2.144

Williams, M. G., Ellis, N. C., Tyers, C., & Healy, H. (1996). The specificity of autobiographical memory and imagineablity of the future. *Memory and cognition, 24*, 116-125.

Wimalaweera, S. W., & Moulds, M. L. (2008). Processing memories of anger-eliciting events: The effect of asking 'why' from a distance. *Behaviour Research and Therapy, 46*(3), 402-409. doi:http://dx.doi.org/10.1016/j.brat.2007.12.006

Wolfsdorf, B. A., Freeman, J., D'Eramo, K., Oveholser, J., & Spirito, A. (2003). Mood states: depression, anger, and anxiety. In A. Spirito & J. C. Overholser (Eds.), *Evaluating and Treating Adolescent Suicide Attempters: From Research to Practice*. New York: Academic Press.

Ze-wei, M., & Wei-nan, Z. (2014). A Multiple Mediator Model: Power Analysis Based on Monte Carlo Simulation. *American Journal of Applied Psychology, 3*(3), 72-79. doi:10.11648/j.ajap.20140303.15